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# Spruce and Larch Bud Moths

United States Department of Agriculture

*PREPARED BY* Forest Service

Alaska Region Leaflet R10-TP-13

# SPRUCE AND LARCH BUD MOTHS

Bud moth larvae, *Zeiraphera* spp., have historically affected white and Lutz spruce stands in southcentral Alaska. They will, however, attack Sitka spruce and larch (tamarack) wherever the host occurs in Alaska. Sitka spruce near Dutch Harbor and Unalaska in the Aleutian Islands and tamarack stands in interior Alaska have been periodically infested. Black spruce is seldom attacked. There are two or more bud moth species with similar behaviors and life histories that cause most of the damage. Although tree damage is not usually severe, the effects from bud moth feeding are unsightly, and can be alarming to homeowners and land managers. This brochure will familiarize homeowners and land managers with the bud moth and provide guidelines for protecting and reducing damage to host plants.

**LIFE HISTORY:** Adult bud moths are small, inconspicuous, gray- to brown-mottled moths with a wingspread of about ½ inch (Figure 1). Adult moths are commonly found flying from late June through July. During daylight hours they are usually found on the lower foliage of host trees. Adult moths become active at dusk. Their nocturnal flight activity is limited in distance and duration and is primarily restricted to the upper crown.

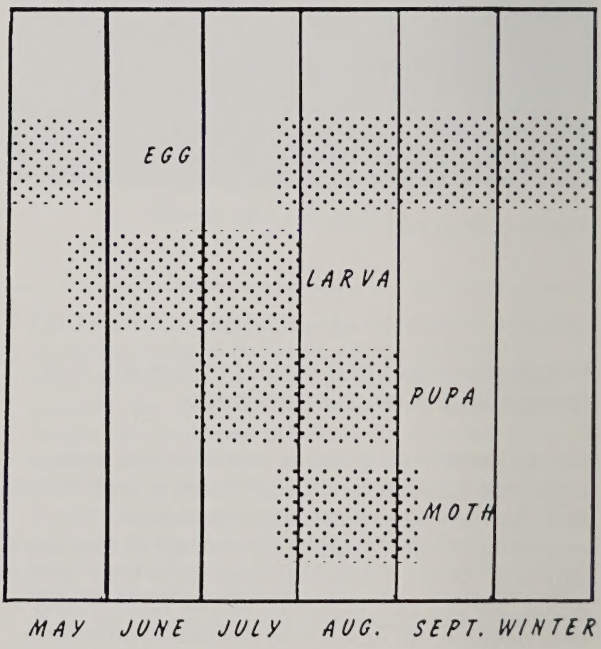
Female bud moths lay eggs from late June to mid-July beneath bark scales, on cones, and in the axes of twigs and branches. The spruce species lay a cluster of 1–7 eggs; the larch species lay eggs singly. Eggs are creamy-yellow when laid and gradually turn orange within a week. The bud moth overwinters as an egg and first instar larvae emerge from early May to early June. Larvae will emerge with warmer

*Figure 1. Adult bud moth.*

temperatures and bud burst, but this will vary throughout the range of the host.

Larvae immediately find a suitable bud, bore under the budcap, and begin feeding within the bud. As feeding progresses, the larvae characteristically attach the budcap to the bud with silk. Often, more than one larva feed within a bud. As the bud expands, larvae feed on the new needles; as larval size increases (about ½ inch long), feeding increases until most of the new needles within a bud are consumed (Figure 2). Larvae of some species of bud moth feed on the new needles along the terminal portion of a

branch, whereas other species feed within one bud throughout the entire larval stage. Larvae feed from 3 to 6 weeks depending on the species of bud moth. When larval development is completed, larvae leave the foliage and drop to the ground on silken threads. They construct cocoons from pieces of moss, dead needles, soil, and any other organic material on the forest floor. The pupal stage lasts from 18 days to 3 weeks and new adults emerge as early as mid-June. There is one generation per year.




*Life history of spruce and larch bud moths,* Zeiraphera *spp.*

*Figure 2. Budmoth larva.*

**DAMAGE:** The bud moth is not considered a major economic forest pest. Damage is usually not serious and there is little tree mortality. Larvae feed exclusively on new foliage and severe infestations may cause reduced growth and multiple and deformed terminal and lateral branches (Cover photo). In many cases, the branch curls as it elongates usually towards the injured side where larvae have scarred the shoot tissue. Deep scarring makes the shoots fragile and susceptible to breakage. Bud moth damage can also predispose the tree to attack by bark and wood-boring beetles and decay fungi.

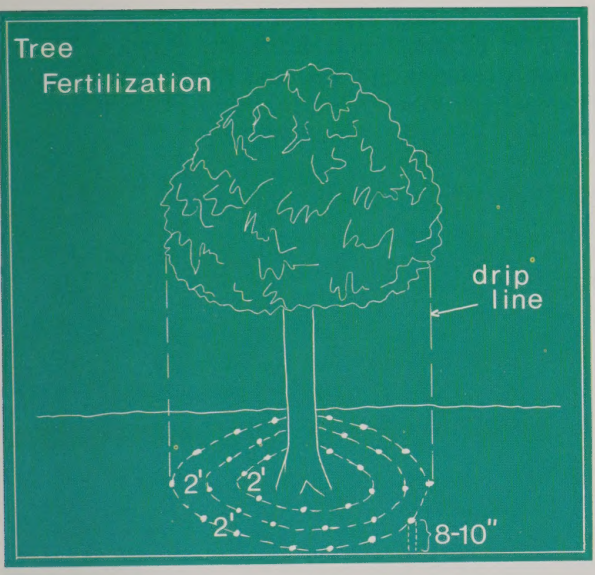
## GUIDELINES FOR REDUCING DAMAGE:

Bud moth damage is rarely severe and suppression is not usually warranted. Trees in urban areas, however, may be more susceptible to bud moth attack, and heavy larval feeding can reduce their aesthetic value. In order to protect ornamental spruce, the following growing conditions should be provided for the tree to withstand periodic heavy defoliation:

- Care should be taken to avoid damaging the trunk and roots, altering the drainage patterns, and severely compacting the soil.
- Trees should receive adequate water throughout the growing season to avoid moisture stress.
- Spring fertilization helps promote tree vigor and helps minimize the effects of bud moth infestation. The USDA Cooperative Extension Service recommends from one to two pounds of fertilizer per inch of tree diameter. Fertilizer is applied in holes 8–10 inches deep in a series of concentric rings starting about 2 feet from the trunk and extending to a few feet beyond the dripline.
- Raking and removing the litter beneath a heavily infested tree at the end of June will destroy and/or remove the pupae and thus reduce the subsequent bud moth generation.

If ornamental spruce have shown signs of heavy bud moth feeding for a few years, the following chemical treatment may be warranted:

- Insecticides should be applied to new buds from late May to mid-June when bud moth larvae are beginning to feed on expanding new growth.
- The insecticides registered for bud moth suppression are *Bacillus thuringiensis* (B.t.), carbaryl, dimethoate, and malathion.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Fertilization
drip
line
2'
2'
2'
8-10"

*Spruce and Larch Bud Moths,* by Edward H. Holsten, Entomologist, State and Private Forestry, Anchorage, AK, and Richard A. Werner, Research Entomologist, Institute of Northern Forestry, PNW, Fairbanks, AK.

Additional information on this insect can be obtained from your local USDA Cooperative Extension Service office, Alaska Division of Forestry office, or from:

**Forest Pest Management**
**State and Private Forestry**
**USDA Forest Service**
P.O. Box 21628
Juneau, Alaska 99802
Phone: (907) 586-8811

Or:

**Forest Pest Management**
**State and Private Forestry**
**USDA Forest Service**
201 East Ninth Avenue
Suite 201
Anchorage, Alaska 99501
Phone: (907) 271-2575

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